

Avoiding Herbicide Damage to Sensitive Crops

The extreme sensitivity of grape plants to the phenoxy herbicides, and related compounds used as an essential part of many farming operations, is one of the most serious problems confronted by Kansas grape growers and vintners. The vines are so sensitive to herbicides such as 2,4-D, trichlopyr, dicamba and picloram, that drift or vapors from applications a mile or more away can produce symptoms of herbicide injury. The Kansas Department of Agriculture is asking both commercial and private pesticide applicators to make themselves aware of vineyards in the area in which they apply pesticides, and to be good neighbors by applying herbicides only when existing, and forecasted, winds would tend to move vapors away from sensitive areas.

Vineyards are easily damaged by the phenoxy group of herbicides, which include 2,4-D, 2,4-DB and MCPA. Phenoxy herbicides can injure the vines and fruits of vineyards if spray drift contacts the foliage. In general, phenoxy herbicides are formulated as esters or amines. The ester formulation is many times more volatile than the amine formulation and should not be used in the vicinity of vineyards or other sensitive crops (cotton, tomatoes, potatoes, many fruits and vegetables, soybeans and other legumes). Spray drift from other herbicides, such as dicamba (Banvel, Clarity or Distinct), picloam (Tordon 22K), or trichlopyr (Remedy), also may damage vineyards, if it comes into contact with foliage. When herbicides are applied under windy conditions, temperature inversions, or high temperatures, or in close proximity to a vineyard, there is potential for damage to the vineyard.

Drift Hazards

There are two common ways in which herbicides move to off-target areas:

Particle drift (droplets). Droplets are formed by sprayer nozzles. The size of the droplets is dependent on nozzle pressure, size of nozzle orifice and the surface tension of the spray solution. The distance a droplet moves off target depends on the size of the droplet, the velocity of the wind and the height from which the droplet is released.

Vapor Drift. Vapor may be generated under high temperatures if a herbicide is volatile. Volatility refers to the ability of a herbicide to vaporize and mix freely with air. Volatile herbicides may produce vapors that can be carried as far as five miles downwind from the target field.

Spray Drift can be reduced by the following:

- ◆ Spray when wind speeds are less than 10 mph.
- ◆ Do not spray when there is a temperature inversion. An inversion occurs when there is calm air, which reduces air mixing and results in spray particles moving downwind in an unmixed layer of air.
- ◆ Select a nozzle that produces coarser (larger) droplets.
- ◆ Use the lower end of the pressure range for a given nozzle.

- ◆ Place boom height just above crop canopy.
- ◆ Use a drift control additive when needed.

Vaporization can be reduced by the following:

- ◆ Switch to a less volatile formulation. For example, switch from the ester form of 2,4-D to the amine form.
- ◆ Spray when temperature will remain less than 90°F for several days.

Symptoms of 2,4-D Injury

Phenoxy herbicides cause abnormal growth by overloading the hormone balance of plants. Broadleaf plants are much more susceptible to injury. Small amounts of a phenoxy herbicide contacting sensitive plants may cause abnormally large leaves and multiplied or enlarged flowering parts. Greater concentrations of the herbicide can cause stunting and cupping of leaves, spiraling growth of soft shoots, clearing and enlargement of major leaf veins and severe distortion of flowering or fruiting parts.

When phenoxy injury is present, the youngest terminal growth is most easily and severely affected. Terminal growth may cease after exposure to phenoxy herbicide and may be retarded for several weeks. Affected terminal leaves are small, narrow, misshapen and have closely packed, thick veins. Vines showing these symptoms seldom produce new growth with normal features for the remainder of the season. Severely injured vines may not recover for two or more years.

Preventing Vineyard and Sensitive Crop Injury

- ◆ Learn the locations of sensitive crops in the area.
- ◆ Avoid the use of ester formulations of phenoxy herbicides in any area near sensitive crops.

- ◆ Follow the earlier guidelines for reducing drift and vaporization.
- ◆ The label is the law. Read and follow directions and precautions. Only apply pesticides on sites (crop or area) that are listed on the label. Application of a pesticide to a site that is not listed on the label is illegal. Do not exceed the rate specified on the pesticide label. The use of a higher rate than the label-recommended rate is illegal. Doubling the maximum label rate does not mean that the applicator will achieve twice the pest control. By following label recommendations and precautions, off-target injury to people, animals and susceptible plants will be reduced.
- ◆ Clean equipment thoroughly after applying any phenoxy herbicide. If several sprayers are available, dedicate one sprayer to phenoxy herbicides. Store all pesticides in original containers — never in unmarked containers. Never re-use empty pesticide containers. Store pesticides in a locked building, cabinet or room, away from food, feed, seed or fertilizer. Follow label directions for storage conditions. Dispose of empty pesticide containers made of glass, metal or plastic by triple rinsing the containers or the equivalent. If a recycling program is available in your county, offer triple-rinsed pesticide containers for recycling. If a recycling program is not available, pesticide containers should be punctured, crushed or broken and then disposed of properly. Triple-rinsed containers can be disposed of in a sanitary landfill, if in accordance with local regulations.

Questions or requests for additional information may be directed to:

Kansas Department of Agriculture
Pesticide Program
109 SW 9th Street
Topeka, KS 66612-1280
(785) 296-3786